# Impact of farmer practices on the quality of maize grain stored in air-tight bags in Tanzania

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## Introduction

The Africa RISING program introduced air-tight bags to mitigate food losses in grain stores of smallholder farmers in Tanzania. If properly applied, households can save about 148 kg of grain (37$) each season, which is enough to provide food for 2-3 months (Mwambo et al., 2016). Other two technologies; mechanical sheller (threshing) and Collapsible Dryer Case (drying) were also introduced to complement and support effective air-tight storage (Fig. 1). However, socio-economic reasons and other factors can incline farmers to interact with these technologies in ways that might deviate from the best practice recommendations (Abass et al., 2014). This study evaluated the influence of harvest timing, dehusking, drying, and shelling practices by farmers on grain quality and overall losses abatement of air-tight plastic bags.

**Fig 1. Improved postharvest technologies introduced in Tanzania for sustainable intensification.**

## Materials and Methods

Participatory trials were conducted during 2015/16 harvesting season in Babati district in Manyara region of Tanzania. The aim was to investigate the extent to which the application of various postharvest protocols by farmers could influence performance of hermetic PICS™ bags. Recruited farmers used their own crop, took charge of the various operations and stored in their own storage structures. Samples were taken at onset of storage and every six weeks for quality assessment over 30 weeks storage duration. A total of 364 samples were examined.

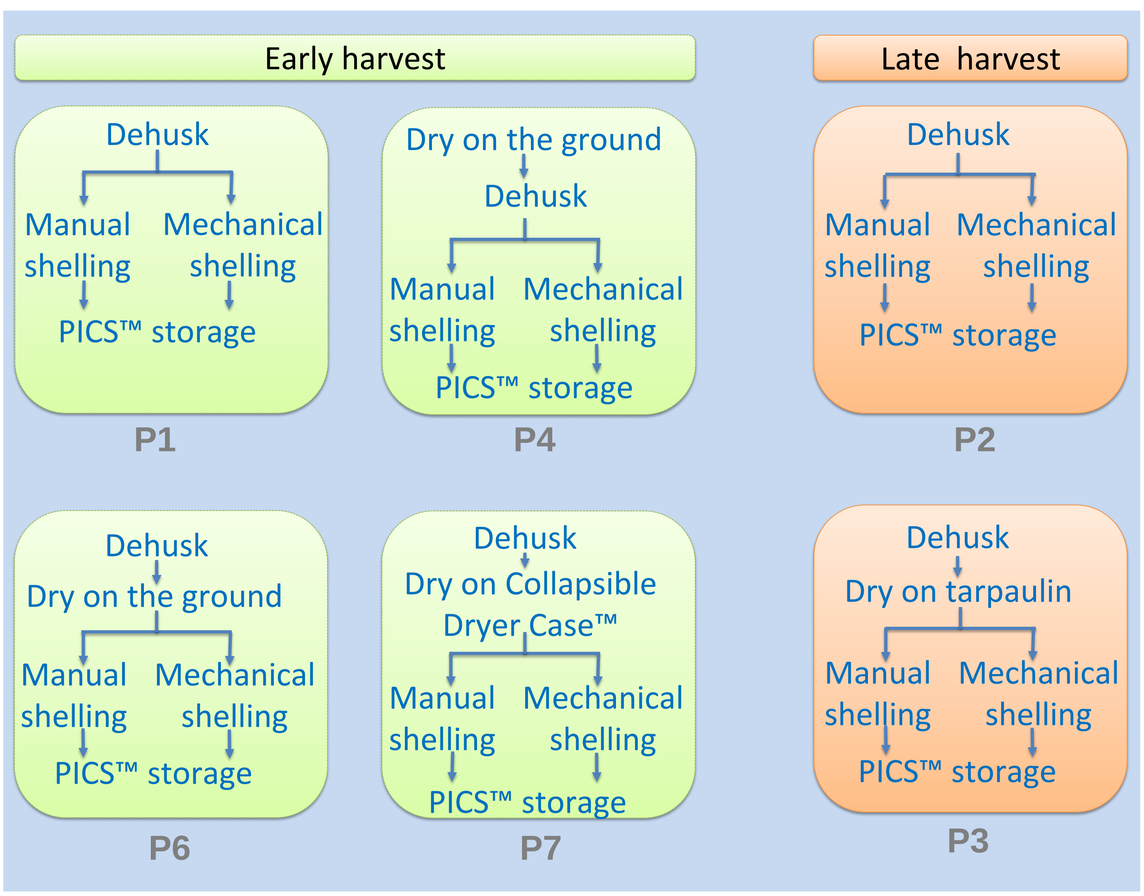


**Fig 2. Postharvest protocols applied by farmers**

## Results and Discussion

Grain damage was observed in the form of visibly moldy, broken, discolored, shriveled, germinated, rotten, and insect damaged grains in all grain lots processed following the various protocols (Fig. 3). Method of shelling influenced the amount of broken grain (Fig 4). A total damage of 9-18% was observed at time of storage. Grain moisture content exceeded 13.5% in four protocols (P1, P2, P4, P6) after 6 weeks of pre-drying The high moisture at bagging was a driver for further deterioration during storage; Total losses reached 6-32% at six months (Fig 5).

**1. Characteristics of grain at time of storage**

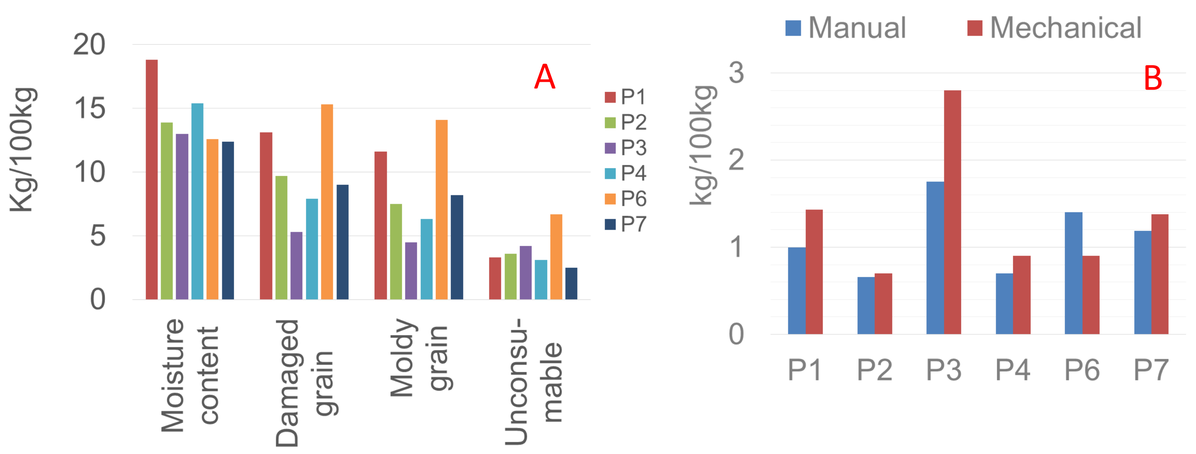


**Fig. 3. Grain moisture and damage (a) and amount of broken grains (b)**

**2. Quality of maize stored in hermetic bags over time**

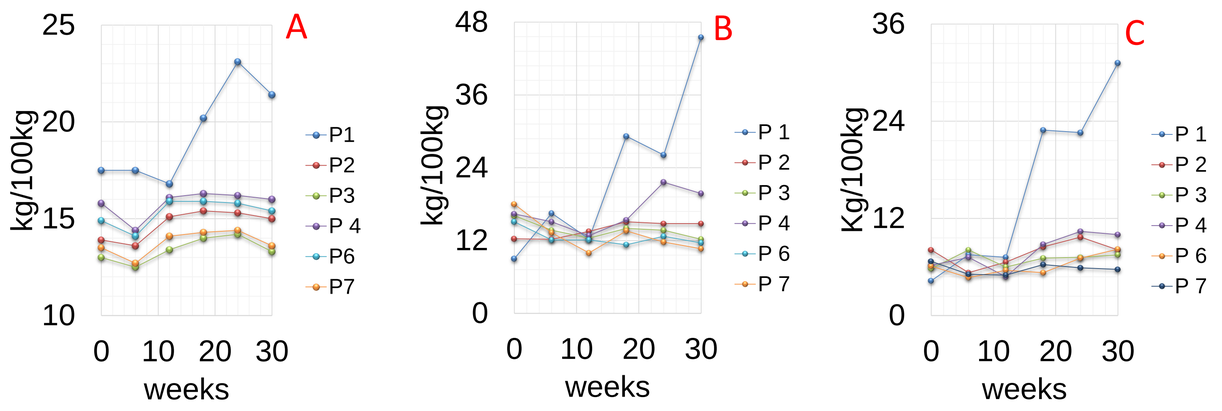


**Fig 5. Moisture content (a), total damage (b), and total losses (C)**

The improvement in quality has impact on market access and prices. E.g. grain lots with total grain damage >8.5 kg/100 kg are not graded for trade within the East African region as per the East African Standards. Grain lots with damage levels of 0-3.2 kg/100 kg, 3.3-7.0 kg/100 kg, and 7-8.5 kg/100 kg are classified as Grade 1, Grade 2, and Grade 3, respectively, which could have significant price differentials.

## Conclusion

The promotion of hermetic storage should be accompanied with farmer education on harvesting and drying protocols as bad quality could significantly dampen the benefits of the technology.

## Acknowledgements

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## References

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